



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

March 18, 2015

Amy Kelley
Code EV21.AK
Naval Facilities Engineering
Command Southwest
1220 Pacific Highway
Building 1, 5th Floor
San Diego, CA 92132

Subject: Draft Environmental Impact Statement for Military Readiness Activities at Fallon Range Training Complex, Nevada (CEQ# 20150017)

Dear Ms. Kelley:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our detailed comments are enclosed.

The Draft Environmental Impact Statement (DEIS) evaluates the impacts of increasing military training at the Fallon Range Training Complex (FRTC) in northern Nevada by 6 percent (Alternative 1) and 16 percent (Alternative 2) over current training levels. The activities that would increase are: Combat Search and Rescue exercises; Gunnery Exercise (Air-to-Ground); High-speed Anti-radiation Missile Exercises; and Missile Exercises (Air-to-Ground). Both alternatives also include two new activities: Ground Light Amplification by Stimulated Emission of Radiation (LASER) Targeting, and Dismounted Fire and Maneuver. Alternative 2 is the Navy's Preferred Alternative.

Based on our review, we have rated the Preferred Alternative 2 as Environmental Objections – Insufficient Information (EO-2) (see enclosed "Summary of Rating Definitions"). Our objections are based on potential impacts from unexploded ordnance (UXO) and off-range munitions contamination on the Walker River Tribal Reservation, which is adjacent to bombing range B-19, and the lack of information regarding mitigation and range clearance. If not promptly retrieved, UXO and munitions that land off-range are considered wastes under the Resource Conservation and Recovery Act (RCRA) and, according to the DEIS, it is Department of Defense policy to comply with the Military Munitions Rule of RCRA. There is no indication in the DEIS that such retrieval is occurring, since the Memorandum of Understanding with the Tribe to address this issue has expired and no discussion of range clearance on tribal land is included in the DEIS or the Operational Range Clearance Plan. Instead, the DEIS states that munitions expenditures at B-19 range do not appear to result in off-range migration of munitions constituents, despite the history of recovery of significant live and inert ordnance on the Reservation.

We also have concerns regarding the completeness and accuracy of the noise impact analysis, since the Naval Air Station Fallon airfield operations for aircraft utilizing the range were segmented into a separate Environmental Assessment and the noise impacts of those operations were not included in the cumulative impact analysis for this Fallon Range EIS. We raised these issues of scope and cumulative impacts in both our scoping comments for this EIS and our comments on the Draft EA for airfield operations. Finally, we have concerns regarding the sufficiency of the sampling design for characterizing contamination from munitions constituents on the bombing ranges, and the conclusions regarding the potential for off-site contaminant migration.

EPA appreciates the opportunity to review this DEIS. When the Final EIS is released for public review, please send one copy to the address above (mail code: ENF-4-2). If you have any questions, please contact me at (415) 972-3854, or contact Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa B. Hanf". The signature is fluid and cursive, with the first name "Lisa" being more prominent.

Lisa B. Hanf, Assistant Director
Strategic Planning Branch

Enclosure: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: Bobby Sanchez, Chairperson, Walker River Paiute Tribe
Cynthia Oseguera, Environmental Director, Walker River Paiute Tribe
A. Joseph Sarcinella V, Esq., Senior Advisor and Liaison for Native American Affairs,
Department of Defense

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

“LO” (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

“EC” (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

“EO” (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

“EU” (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

Category “1” (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category “2” (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category “3” (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

Tribal Consultation / Impacts from Munitions and Unexploded Ordnance to the Walker River Indian Reservation

The Bravo-19 (B-19) range is adjacent¹ to the Walker River Indian Reservation on its southern border and there is a history² of munitions landing on the Reservation³. The DEIS references a Memorandum of Agreement with the Walker River Paiute Tribe that the Navy signed in 2005⁴ for the safe removal of munitions found on tribal lands (p. 3.9-16), but nothing more is mentioned on the issue. We requested and received a copy of the MOU from the Navy. It is not clear whether the Navy regularly conducts range cleaning operations on the Reservation or whether the MOU is still in effect, since it appears to have expired in 2012. The Tribe's website indicates that the problem of unexploded ordnance on the Reservation poses a legal and technical burden for the Tribe and they believe that it poses a serious safety hazard to anyone who may venture into this area, which has no warning signs or fencing⁵. The expired MOU included intentions to meet with the Tribe twice a year to foster better communications, and once a year to conduct a safety demonstration for the Tribe regarding the identification and procedures to take when Tribal members come in contact with military or non-military ordnance. The range clearance commitments made by the Navy in the MOU are important for addressing safety concerns, especially with the increased training under the proposed action.

All munitions that land off-range that are not promptly retrieved would be considered to be a solid or hazardous waste under EPA's 1997 Military Munitions Rule (40 CFR Parts 260-266, and Part 270 of the Resource Conservation and Recovery Act, in particular Section 266.202(d)). The DEIS states that it is Department of Defense policy to implement the Military Munitions Rule (p. 3.1-1), yet there is no substantive discussion of this issue. It appears that additional UXO and munitions contamination could occur as a result of the increased training scenario under the Preferred Alternative⁶ and it is not clear that the Navy is taking responsibility for the existing off-range impacts, since the DEIS states that munitions expenditures at B-19 range do not appear to result in off-range migration of munitions constituents (p. 3.7-17, 3.7-19).

Tribal consultation with the Walker River Tribe has consisted, thus far, solely of two letters sent to the Tribe - one announcing the scoping period in 2013, and one announcing the availability of the DEIS⁷. Our conversations with the Tribe indicated that they had not been notified that the DEIS was available for public review, and they showed great interest when EPA shared the information. We understand the Navy considers tribal consultation to be ongoing; however, we are concerned that the Navy's efforts, thus far, fell short of ensuring that the Tribe was aware of the public comment period for the DEIS. The

¹ Range Compatibility maps show B-19 extending onto the Reservation.

² A Naval Research Laboratory Report from 1998 states that "over the past decade, periodic Off-Range Ordnance (ORO) sweeps by the EOD Mobile Unit 3 have recovered *significant* live and inert ordnance from the Walker River Indian Reservation adjacent to the south border of the NAS Fallon Training Range Bravo-19" (italics ours). From *MTADS Demonstration at the Walker River Paiute Reservation Schurz, NV - November 1998*, NRL/PU/6110-00-406.

³ EPA provided a special purpose grant to the Walker River Tribe in 2010 to build capacity to assess the extent of the unexploded ordnance (UXO) contamination on the reservation as a result of the B-19 range.

⁴ Document was a Memorandum of Understanding (MOU) signed in 2007.

⁵ <http://www.wrpt.us/environ.htm>

⁶ The DEIS indicates that the Preferred Alternative 2 would result in the following additional annual ordnance expenditures at Range B-19: 56 additional inert bombs; 281 additional live bombs; 64 additional explosives; 3 additional inert missiles; 206 additional live missiles; 31 additional live mortars, and 92,698 additional live ammunition.

⁷ Personal conversation, Amy Kelley, NAVFAC Southwest, Feb. 26, 2015.

public comment period provides an important opportunity for the Tribe to comment publically and be a part of the public record, should they choose to do so.

Recommendations: In the FEIS, provide a discussion of the history of munitions expenditure on the Walker River Reservation. Because the MOU includes a reporting procedure, we assume that data are available on the frequency and extent of aircraft mishaps and of off-range ordnance, flares, or other military munitions landing on Tribal lands. The FEIS should include this information, since it is central to the impact assessment. Disclose whether and, if so, how off-range UXO and munitions on the Walker River Indian Reservation are being managed in compliance with the Military Munitions Rule. Informed by the above history, revisit the conclusions that munitions expenditures at B-19 range do not appear to result in off-range migration of munitions constituents. Consider the information and concerns expressed on the Walker River Tribe's website; consult with the Tribe; and adjust, as appropriate, the discussions on environmental justice regarding impacts to the Tribe.

Provide an update on the tribal consultation with the Walker River Tribe in the FEIS. Disclose that the referenced MOU is expired and discuss any plans to renegotiate an MOU to address current and future off-range ordnance on Tribal land. Establish a new MOU with the Tribe that reflects the increased risk of off-range munitions that could occur as a result of increased training. We strongly recommend that any such MOU reestablish or enhance the coordination and safety education provisions of the expired MOU.

Explain, in the FEIS, how the Navy is complying, and would comply under the proposed action, with the Military Munitions Rule for munitions that land off-range on the Walker River Indian Reservation. Discuss whether the beneficial procedure outlined in the Native American Lands Environmental Mitigation Program (NALEMP) Implementation Manual⁸ is applicable and whether any components of it are being implemented.

Discuss, in the FEIS, additional mitigation measures that could eliminate or minimize future ordnance and munitions expenditures on the Reservation, such as the possibility of moving the target areas away from the Reservation border, utilizing only inert munitions on Range B-19, as is done with Range B-16, installing warning signs or fencing, or the provision of other benefits to the Tribe, as informed by Tribal consultation.

Noise Impacts and NEPA Segmentation

The Navy conducted an Environmental Assessment for the airfield operations at Naval Air Station (NAS) Fallon during the same general time period in which this EIS was being initiated, yet the Navy chose to separate the actions of aircraft takeoff and landings from NAS Fallon with the flight activity of those same planes in the Special Use Airspace (SUA). This could represent improper segmentation. The Council on Environmental Quality (CEQ) NEPA Regulations state that similar actions – those which “when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography” should be evaluated in the same EIS “when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement” (40 CFR 1508.25 (a) 3). We are especially concerned that the noise impacts from these actions were not evaluated together in the same impact assessment.

⁸ <http://denix.osd.mil/na/upload/NALEMP-Implementation-Manual.pdf>

In this case, there is both common timing and geography. The Fallon Range Notice of Intent to prepare an EIS was published (July 2013) before the completion of the EA for Airfield Operations at Naval Air Station Fallon (August 2013), therefore both actions were under NEPA review simultaneously and could have been coordinated, as we suggested in our July 8, 2013 scoping comments for Range Operations, as well as raised as a scope of analysis issue in our July 18, 2013 comments on the Draft EA for Airfield Operations. We understand that aircraft may arrive for training in the Fallon Range from other air stations; however, the DEIS states that aircraft “typically originate at NAS Fallon for training in the Fallon Range” (p. 3.4-21). According to the Navy⁹, the actions of aircraft at the airfield were separated from the actions of those same aircraft in the greater Fallon range because of different controlling commands and different timing. If the Navy found evaluating the airfield operations together with the Fallon Range operations unworkable, the EIS should have ensured that the cumulative impact analysis in the EIS accounted for the noise impacts from the aircraft at NAS Fallon. According to the Navy¹⁰, the noise increases for the airfield operations were not represented in the noise contours under the EIS’s No Action Alternative, which represents the existing condition. The Navy states¹¹ that this was because the airfield action has not yet occurred. The Navy could have ensured the noise impacts from the airfield operations were represented in the cumulative noise analysis, regardless of whether they were yet occurring. We note that there is precedent for doing this in the Guam and Commonwealth of the Northern Mariana Islands (CNMI) Military Relocation EIS. In the Guam EIS, the noise impacts from the ISR/Strike Force at Anderson Air Force Base, which were not yet occurring, were included in the noise contours and analysis for the increased training proposed in the Guam and CNMI Military Relocation EIS. This would be an appropriate way to evaluate cumulative noise in the Fallon Range EIS since the airfield actions were absent from the EIS scope of analysis. This is especially concerning since the EA revealed noise impacts at levels that could induce hearing loss (>80 A-weighted decibels) to 9 new receptors (p. 4-28). It is important that the noise impact modeling for the Fallon Range EIS account for these high noise impacts that would occur within the range airspace.

Recommendation: Revise the noise analysis to include the predicted noise estimates from the Airfield Operations EA, from which the majority of aircraft utilizing the Fallon Range originate. This would represent the noise analysis that would have been estimated had the Navy not separated the connected and similar actions of airfield and airspace use.

Include a map of aircraft noise for Range B-19, since this was not included in the DEIS.

Soils / Munitions Contamination

Fallon Range Condition Assessment

The DEIS indicates that Range Condition Assessments are required every 5 years (p. 3.1-2) and are reevaluated whenever significant changes (e.g., changes in range operations, site conditions applicable statutes, regulations, DoD issuances, or other policies) occur that affect determinations made during the previous assessment (p. 3.1-2). The most recent RCA was performed in 2008, but it is not clear whether an RCA is currently being performed according to the 5-year requirement or would be performed as a result of the change in range operations.

We requested and received a copy of the 2008 RCA from the Navy. We are concerned that the sampling design may not have been sufficient to accurately represent the contamination on the sites. The 2008

⁹ Personal conversation, Amy Kelley, NAVFAC SW, 2/26/15.

¹⁰ *ibid*

¹¹ *ibid*

RCA indicates that sampling occurred by compositing 5 samples in the field. DoD's own studies¹² show that 5 sample composites for explosives residues on bombing ranges performed very poorly in comparison to the incremental sampling methodology/multi-incremental sampling method in EPA Method 8330B using a minimum of 30 sampling increments.

Recommendation: We recommend that the RCA be updated per the 5-year requirement and due to the changes in range operations that would occur under this action. We recommend that sampling occur in accordance with EPA Federal Facilities Forum Issue Paper: *Site Characterization for Munitions Constituents*, January 2012¹³ to more accurately assess the level of contamination and the potential for off-site migration. The appropriate sampling design is discussed in EPA publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Method 8330B, Appendix A.

Perchlorate

The DEIS concludes there are no potential impacts from perchlorate compounds (3.1-13). The RCA states that the soil samples were analyzed for all munitions constituents (MCs) listed in the Range Sustainability Environmental Program Assessment manual except for perchlorate, and that a qualitative review of the mechanisms for release of perchlorate was conducted. This evaluation showed that potential perchlorate releases would be widely distributed across the ranges, and only a very small total mass of perchlorate could potentially be released, which would result in concentrations of perchlorate that would be well below typical detection limits. The Navy also concluded that it expects that perchlorate from other sources (i.e., geologic) may be present in greater concentrations, and any sampling effort would provide a documentation of perchlorate concentration from sources other than range operations (RCA, p. 5).

We are concerned that the Navy has eliminated this compound from testing and has not followed the guidance of the Range Sustainability Environmental Program Assessment manual. Without quantitative sampling data, there is insufficient information to support the conclusions in the RCA and DEIS that perchlorate levels result in no potential impacts. Perchlorate is very soluble and exhibits little to no soil adsorption. Surface and groundwater contamination concentrations would build as a function of perchlorate loading. There is insufficient evidence in the DEIS that any deposition of perchlorate is likely to be below detection limits. Additionally, natural occurring perchlorate would likely occur in very small quantities, usually less than 1 part per billion, and would not render quantitative test results meaningless, as the DEIS implies.

Recommendation: In the FEIS, indicate which munitions proposed for use on the ranges contain perchlorate, as identified in DoD's Munitions Items Disposition Action System (MIDAS) database, and the quantities that are expected to be released across the ranges. We strongly recommend that the Navy follow the guidance in the Range Sustainability Environmental Program Assessment manual and, in the next RCA, conduct the testing for perchlorate that was eliminated from the 2008 RCA sampling. Clarify, in the FEIS, when the next RCA will be conducted. If the Navy intends, in future RCAs, to continue to utilize the rationale that naturally-occurring background perchlorate levels would be present in greater concentrations than that originating from Navy training, we recommend that background sampling and testing

¹² National Defense Center for Energy and Environment (NDCEE), *Demonstration/Validation of Incremental Sampling at Two Diverse Military Ranges and Development of an Incremental Sampling Tool*, June 2010.

¹³ http://www2.epa.gov/sites/production/files/documents/site_characterization_for_munitions_constituents.pdf

using isotopic analysis methods be conducted to distinguish natural from man-made sources of perchlorate.

Operational Range Clearance Plan and Impacts

The DEIS states that the *Fallon Operational Range Clearance Plan* was completed in 2013 for NAS Fallon and the FRTC. The Plan was not included in the DEIS, but the DEIS states that its continued implementation would substantially reduce potential impacts on groundwater, and concludes that potential impacts on groundwater at the training ranges would not be significant (pp. 3.3-22 – 3.3-24) and, overall, would be negligible (p. 3.3-26).

While regular range clearance may reduce concentrations of munitions constituents, the DEIS does not identify the potential risk of contamination from range clearance when blow in place (BIP) detonations of unexploded ordnance (UXO) are performed. BIP of UXO can result in a greater amount of residue deposition than if the munitions functioned as designed on impact¹⁴. High order detonations and occasionally low-order detonations can cause significant deposition of MCs.

Recommendation: Include as an appendix and/or summarize the Operational Range Clearance Plan in the FEIS. Disclose the impacts from high order and low-order BIP detonations that are part of range clearance activities, and discuss the effectiveness of the Plan as mitigation, taking such impacts into consideration.

Lead Contamination from Small Arms Ranges

The proposed action would substantially increase the amount of small- and medium-caliber live rounds expended on the ranges. The tons per year of live rounds would more than double on range B-16 (from 15 to 32 tons per year) (p. 3.3-11), and increase by 5 tons per year across the other ranges. The DEIS indicates that lead is the primary constituent of concern because of its toxicity and ability to persist in the environment, but states that lead is relatively immobile because of the pH of the soils and the limited precipitation in the project area (p. 3.3-12). The latter factors are relevant to transport through soil; however, studies show that lead mobilization occurs chiefly by wind and surface water erosion, generally not by dissolution and leaching through soil¹⁵. The type and frequency of maintenance performed on the backstop and range floors affects the ability for off-site transport¹⁶. The DEIS states that spent small- and medium-caliber rounds would not be removed at regular intervals, but would slowly accumulate in soils over long periods of time in areas of concentrated use (p. 3.1-14). The DEIS does not identify any best management practices or maintenance measures to prevent erosion of berms and backstops, which are highly susceptible to erosion during rainstorms and could provide a transport mechanism for lead attached to soil particles. The increased intensity of rainstorms predicted and already occurring under climate change add to the risk for eroded soil to be transported off-site by stormwater. The DEIS indicates that several major ephemeral stream channels converge northwest of B-16 and cross the training area as they flow to Carson Lake (p. 3.3-8).

An additional route of transport that was not discussed in the DEIS is air transport. At small arms ranges, lead dust may enter the air from the small arms barrel plume or fugitive dust generation. The transport of lead through the air, with final deposition to surface water or soil, is an important transport

¹⁴ EPA Federal Facilities Forum Issue Paper: *Site Characterization for Munitions Constituents*, January 2012. Available: http://www2.epa.gov/sites/production/files/documents/site_characterization_for_munitions_constituents.pdf

¹⁵ U.S. Army Corps of Engineers, 2007. Environmental Assessment of Lead at Camp Edwards, Massachusetts, Small Arms Ranges.

¹⁶ Prevention of Lead Migration and Erosion From Small Arms Ranges, U.S. Army Environmental Center, 1998.

mechanism; therefore, lead's ability to contaminate adjacent lands can be expected to be proportional to the amount of lead loading at ranges¹⁷.

Recommendation: Discuss the potential impacts of lead mobilization by wind and water erosion. Identify best management practices to reduce this potential and ensure they are implemented on the ranges as part of the proposed action. The following practices are identified in the U.S. Army document *Prevention of Lead Migration and Erosion from Small Arms Ranges* and should be evaluated in the FEIS:

- Physical removal of lead from backstops on a regularly scheduled basis. A sifting/screening process is described in the above document.
- Soil pH monitoring and modification if necessary. The DEIS indicates that soils in B-16 are strongly alkaline (p. 3.1-5) and are mildly to strongly alkaline on the other ranges, with pH levels ranging from 7.0 – 9.4 (p. 3.1-14). Lead is least mobile between a pH of 6.5 and 8.5.
- Contouring or reshaping backstops to direct or reduce the velocity of runoff. Soil erosion on backstops is the principal mechanism for transport of lead on training ranges to surface water.

Fugitive dust

The DEIS does not evaluate the fugitive dust impacts quantitatively, but identifies various activities that would generate fugitive dust and concludes that Best Management Practices would minimize dust (p. 3.2-17). The list of BMPs includes the following: *“When warranted, water or another dust palliative product would be used as necessary to minimize generation and downwind migration of fugitive dust, especially on dry, windy days”*.

Recommendation: In the FEIS, provide more information on how this BMP would be implemented, including how personnel would determine when this BMP is warranted, and whether water or dust palliative products would be present onsite during training.

Additional air comments

- Table ES-2 for Air Quality (p. ES-8) references attainment status in relation to hazardous air pollutants. Attainment status relates to criteria pollutants.
- The DEIS states that potential impacts of chaff expenditure on the FRTC Study Area environment are further assessed in Section 3.1 (Soils) and Section 3.3 (Water Quality) (p. 3.2-10), but chaff is not mentioned in either the soils or water quality chapters.

Climate Change

The DEIS includes a good general discussion of climate change and greenhouse gas (GHG) emissions. The discussion includes a percentage breakdown of carbon dioxide (CO₂) emissions of various domestic transportation sources, revealing that the largest sources are passenger cars and light-duty trucks (61% of CO₂ emissions) and medium- and heavy-duty trucks (22%), with commercial aircraft at 7% (p. 4-38).

While aviation, in general, represents a small percentage of fossil fuel use, it is important to discuss the unique impacts aviation emissions contribute due to their release at altitude. The majority of aircraft emissions occur high in the atmosphere and the impact of burning fossil fuels at altitude is approximately double that of burning the same fuels at ground level. In addition, the mixture of exhaust

¹⁷ Fate of Munitions Constituents in the Environment, Jeffrey W. Talley, Ph.D., Malcolm Pirnie Consultants, prepared for DoD.

gases discharged from aircraft perturbs radiative forcing (the heating effect caused by GHGs in the atmosphere) 2 to 4 times more than if the exhaust was CO₂ alone¹⁸. Emissions from jet aircraft also lead to the formation of cirrus clouds, as the condensation trails (contrails) of water vapor and sulfur particles emitted from engines at high altitudes form ice crystals that persist as clouds under some atmospheric conditions. Scientists are uncertain how to measure the occurrence and impact of such clouds, but they are reasonably certain that the clouds add to the greenhouse effect of aircraft emissions, perhaps substantially¹⁹.

The DEIS provides predictions of annual GHG emissions that would occur under the alternatives and calculates these values as a percentage of total U.S. GHG emissions (Table 4-4, p. 4-39). The Council on Environmental Quality recently released revised draft guidance for Federal agencies on the consideration of GHG emissions and climate change impacts under NEPA²⁰. Recognizing that climate impacts are not attributable to any single action, but are exacerbated by a series of smaller decisions, the draft guidance discourages unqualified statements in NEPA documents that the emissions from a particular proposed action represent only a small fraction of local, national, or international emissions, as not helpful to the decision-maker or public (CEQ draft guidance, p. 6).

The climate change discussion also identifies the Navy's goals of improving energy security and environmental stewardship and reducing reliance on fossil fuels (p. 4-37). While the DEIS identifies the general actions that the Navy is taking to address climate change, it does not identify DoD's specific actions regarding aircraft emissions, which relate more closely to the proposed action. According to the U.S. Aviation Greenhouse Gas Emissions Reduction Plan²¹, DoD and its various branches have a number of specific military propulsion programs and initiatives underway to improve aircraft energy efficiency, which will also reduce GHGs. These include the VAATE (Versatile Affordable Advanced Turbine Engines) Program and several technology development programs under VAATE that strive to meet specific energy goals; the Adaptive Versatile Engine Technology (ADVENT) Program, which is developing critical technologies to provide military turbofan engines with 25 percent improved fuel efficiency to reduce fuel burn and provide more range, persistence, speed and payload; and the Adaptive Engine Technology Development (AETD) program, which seeks to accelerate technology maturation and reduce risk for transition of these technologies to a military engine in the 2020+ timeframe. Such technology would be applicable to a range of military aircraft (fighters, bombers, etc.).

Recommendations: We recommend that the FEIS: (1) include a discussion of the unique climate change impacts of burning fossil fuels at altitude, as explained above; (2) remove computations of project GHG emissions as a percentage of total U.S. GHG emissions; and (3) highlight the programs the DoD is investing in to increase fuel efficiency for military aircraft.

¹⁸ Military Aviation and the Environment: Historical Trends and Comparison to Civil Aviation. Available: <http://web.mit.edu/aeroastro/sites/waitz/publications/Mil.paper.pdf>

¹⁹ Congressional Research Service, 2010. *Aviation and Climate Change*. Available: http://assets.opencrs.com/rpts/R40090_20100127.pdf

²⁰ <http://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance>

²¹ Available:

http://www.faa.gov/about/office_org/headquarters_offices/apl/enviro_n_policy_guidance/policy/media/Aviation_Greenhouse_Gas_Emissions_Reduction_Plan.pdf